

## CANISTEL CULTIVARS IN SOUTH FLORIDA

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**Abstract.** The canistel (*Pouteria campechiana* (HBK) Baehni) is a lesser-known member of the Sapotaceae native to lowland Central America. Canistel has been used as a dooryard fruit in South Florida for decades and there have also been unsuccessful attempts within the state to commercialize this fruit. The interest in the canistel within Florida and the importation of germplasm from other regions has led to the selection of numerous superior selections. Presently, Florida may have a greater diversity of genetic material than any other location in the world. However, to date, there has not been a systematic attempt to characterize local and imported selections. In 1987 Fairchild Tropical Garden began to acquire and characterize superior canistel cultivars under field conditions in Miami, FL. Data have been collected for the past 6 years on 'Bruce', 'Fairchild 1', 'Fairchild 2', 'Fitzpatrick', 'Keisau', 'Ross', 'Saludo', 'TREC 9680', 'TREC 9681' and 'USDA 1'. These data allow us to characterize the field performance of each selection and resolve confusion over multiple names given to the same selection. Such data will be needed if the canistel is ever to assume an important commercial or subsistence role in Tropical America.

The canistel is a member of the Sapotaceae, native to lowland Tropical America. Its original distribution is thought to be the Yucatan Peninsula, the Peten region of Guatemala, extending to El Salvador (Barrera, 1980; Martin and Malo, 1978; Morton, 1987). The fruit was cultivated by native peoples, with the name derived from the Maya word "kanisté" (Niembro-Rocas y Altamirano-Sanchez, 1994). The extent of use, selection and distribution of the canistel by indigenous people is not known, but at present it is uncommon within the home gardens of its native range (Niembro-Rocas y Altamirano-Sanchez, 1994). Considerable effort must be employed to locate individual trees, and there is little evidence of superior selections, as seen with *Pouteria sapota* (Jacq) [H. Moore and Stearn], and *Pouteria hypoglouca*, which are commonly cultivated and clonally maintained within home gardens of the region.

The canistel is highly adaptable to varied edaphic and climatic conditions (Sauls and Campbell, 1980; Martin and Malo, 1978) and was introduced to many locations in the American and Asian tropics (Martin and Malo, 1978; Morton, 1987). It is also relatively precocious, heavy bearing and nutritious (Morton, 1986). Yet, it has remained unimportant as either a dooryard or commercial fruit in most locations, remaining only as a part of botanical and introduction gardens and miscellaneous fruit collections. The greatest success for the canistel has been in the Caribbean region (Cuba, Florida), the Philippines, and Hawaii. There is no commercial production of this fruit presently in these locations, although the fruit are sold from home gardens in the Caribbean region and Southeast Asia.

Little information is available on canistel selections and the availability of superior clones. South Florida has been the

site of perhaps the greatest effort in the selection of superior clones; however, this effort has been conducted by local hobbyists, universities and the federal government, with no central coordination of efforts. Consequently, selections have been lost or assigned duplicate names and there is no centralized collection. The present work describes evaluation data collected since 1987 at Fairchild Tropical Garden, Miami, FL. If canistel is ever to attain an increased importance within tropical and subtropical locations of the world, such collections will need to be carefully characterized, and material made available for future development.

### Description of Collection

The collection was planted in 1987 at the Fairchild Tropical Garden Research Center, Miami, FL. The site is located within 100 m of Biscayne Bay, with an oolitic limestone rock substrate. Planting holes were prepared with a backhoe, breaking the rock down to a depth of 1 m, and backfilled with the unamended mixture of crushed rock and soil. All of the trees were propagated from scions collected within the local community, the Caribbean region and Southeast Asia. In 1987, three trees of 'Bruce', 'Fairchild 1', 'Fairchild 2', 'Keisau', 'TREC 9680' and 'USDA 1' were planted, but in 1992 Hurricane Andrew severely damaged the collection, and reduced the number of individuals of each clone. Trees have been rejuvenated and new selections added in 1993 and 1995. Presently the collection contains 12 selections, varying in age from 1 to 11 yr (Table 1).

Collection maintenance is according to commercially-accepted protocols for South Florida, including applications of a balanced, complete fertilizer (6-6-6 or 12-4-9) at 4 times during the growing season and foliar applications of micronutrients twice per year. Total applied nutrition is based on tree size and crop load. Iron chelate (Sequestrene 138, Ciba-Geigy Corp.) was applied once per year. Locally-produced plant debris mulch was applied annually to a depth of 10 cm, with one

Table 1. Origin of canistel [*Pouteria campechiana* (HBK) Baehni] selections within the collection at Fairchild Tropical Garden, Miami, FL. November, 1997.

Selection	Origin
Bruce	South Florida, named for Bruce Ledin.
Fairchild 1	The Kampong, Miami, FL. Seedling of original tree planted by David Fairchild.
Fairchild 2	The Kampong, Miami, FL. Seedling of original tree planted by David Fairchild.
Fitzpatrick	TREC, U. of Florida, Homestead, FL. Selection from Mr. Fitzpatrick.
Keisau	South Florida, named for Mr. Keisau.
Ross	Introduced by Bill Whitman from Costa Rica.
Saludo	Introduced from Hawaii by F. Sekiya, Hilo, HI.
TREC 9680	TREC, Univ. of Florida, Homestead, FL. Seedling selection, origin unknown.
TREC 9681	TREC, Univ. of Florida, Homestead, FL. Seedling selection, origin unknown.
USDA 1	U.S. Department of Agriculture, Miami, FL. Seedling selection, origin unknown.

or two Roundup applications per growing season for weed control. Irrigation was used for tree establishment.

### Data Collection

Fruit were harvested at the yellow, firm stage and allowed to ripen at a temperature of 20 to 25C in the laboratory. Fruit were evaluated for shape, length, width, weight, seed number and weight, and flavor. Evaluation data were taken from 1992 to 1997. The number of years of evaluation varied widely for the different cultivars (Table 2) due to the effects of Hurricane Andrew and tree age. Limited public evaluations were conducted on taste acceptance from the retail outlet at Fairchild Tropical Garden. Yield data were collected in 1997 for 'Bruce' and 'TREC 9680'.

### Results and Discussion

'Bruce'. 'Bruce' is a large, uniform and attractive fruit with a favorable flesh to seed ratio. There is little aroma and the eating quality is generally rated as somewhat inferior due to the dry, mealy texture of the flesh. Production is concentrated during the middle to late summer (Aug-Oct) and winter (Feb-Mar). 'Bruce' is similar in appearance and internal quality to 'TREC 9680', but the fruit production in 1997 was 62 kg/tree, which was significantly less than the 125 kg/tree for 'TREC 9680' during the same period.

'Fairchild 1'. Fruit shape and size are irregular, although the majority of the fruit are attractive. Production has been concentrated in the late summer (Sep-Oct), with smaller crops throughout the winter and spring months. Yield data are not available, but in general production has been less than 'Bruce' or 'TREC 9680'. The tree is upright in habit and of smaller stature compared with other selections. Trees have been maintained at a height of 3.5 m and a spread of 3 m with a single pruning during the winter. The flesh is moist and soft, with a pleasant flavor. The aroma is rather strong and unpleasant.

'Fairchild 2'. The tree is upright and of moderate vigor. Fruit shape and size are more irregular than 'Fairchild 1', with a typical curved appearance. Production has always been light and irregular, being spread throughout much of the year. Production has been irregular partially due to injuries sustained from Hurricane Andrew. The flesh is moist and considered among the best flavored by many in Florida. The aroma is usually weak.

'Fitzpatrick'. The tree is upright and compact, with small, distinctive leaves. Production is heavy and concentrated in the fall and winter (Sep-Jan). The fruit are uniformly small

and attractive, with a greenish yellow color at maturity. The flesh is moist and sweet, and of good quality. The aroma is strong and often objectionable. This fruit type is common throughout the Caribbean region.

'Keisau'. The tree is moderately vigorous and open, requiring one pruning per year to maintain its height of 3.5 m and spread of 3.5 m. The vigor is markedly less than either 'TREC 9680' or 'Bruce'. Production is heavy, with the main season in the winter months. The fruit are medium-sized with a distinctive shape and a rather dry flesh. This selection is similar to 'TREC 9681', although the fruit shape has tended to be more elongated.

'Ross'. This selection is the most distinctive in appearance among the cultivars. It is oblately-flattened, with striations on the fruit surface. The color is greenish-yellow at maturity, gradually turning to an orange-yellow. The tree is slower-growing, requiring only one light pruning per year to maintain a height of 3.5 m and a spread of 2 m. The tree is often sparsely foliated, leading to sun-burning of the fruit. Production is medium to heavy and concentrated in the fall and winter months. Fruit size is highly variable and the flesh is moist and sweet, with a strong aroma. 'Ross' is considered by some to be a separate species.

'Saludo'. This selection was recently received from Hawaii and insufficient evaluation data is available for detailed discussion.

'TREC 9680'. Fruit are large, uniform and attractive. The flesh is dry and mealy in some years. The production is extremely heavy, with 125 kg/tree in 1997. The tree is vigorous and spreading. Trees require pruning twice per year to maintain a height of 4 m and a spread of 4 m. Production is concentrated in the early Fall (Sep-Oct) and Winter or early Spring (Feb-Apr). This is one of the most attractive selections due to its size, shape and color.

'TREC 9681'. Evaluation data are limited on this cultivar; however, it is similar in most respects to 'Keisau'. The fruit have been more uniform and the trees have been highly precocious.

'USDA 1'. Fruit are irregular and often curved. The tree has a slow, upright growth pattern, requiring only 1 pruning to maintain a height of 3.5 m and a spread of 2 m. The flesh is dry and mealy, with a large number of seeds. Production has been irregular and light, although yields have been influenced by Hurricane Andrew.

*General.* For all of the selections, production season is difficult to assess, as under Florida conditions, the canistel will bloom and fruit throughout the year following pruning or other growth-arresting events (e.g. growth regulators, drought, low temperatures). The ability to manipulate the

Table 2. Fruit quality characteristics of canistel cultivars within the collection at Fairchild Tropical Garden, Miami, FL. 1992-1997.

Selection	Fruit weight (range) [g]	Seed number (range) [g]	Av. Seed weight (g)	Fruit/Seed Ratio	Comment
Bruce	375 (185-675)	1.8 (1-4)	12	17.4	Large, uniform, dry flesh.
Fairchild 1	206 (120-365)	1.7 (1-3)	12	10.1	Medium to large, irregular, moist flesh.
Fairchild 2	161 (60-255)	2.1 (1-4)	11	6.7	Medium, irregular, moist flesh.
Fitzpatrick	70 (44-96)	1.4 (1-3)	6.9	7.2	Small, productive, moist.
Keisau	253 (192-322)	2.8 (1-4)	12.5	7.2	Large, pointed fruit, medium dry.
Ross	121 (75-160)	1.6 (1-3)	3.5	21.6	Oblate, greenish-yellow, moist.
Saludo	—	—	—	—	Reported as excellent eating quality
TREC 9680	395 (190-715)	1.7 (1-4)	12	19.4	Extremely large, uniform, dry flesh.
TREC 9681	245 (142-272)	2.2 (1-4)	11.5	9.7	Similar to Keisau, fruit uniform.
USDA 1	227 (79-285)	3.2 (1-5)	11	6.4	Irregular, dry, low production.

cropping season could be important for the use of this fruit in both large-scale production systems and small-scale sustainable systems within the tropics and subtropics. Under other climatic conditions there may be more distinct production times as a result of prolonged dry periods or other climatic factors. Yield data are lacking for all of the selections due to the damage from Hurricane Andrew and lack of resources. Currently, yield data are being collected to better assess their potential yield and production season. The production information presented above is only for general comparison among the selections.

Previous authors have clearly detailed the potential of the canistel for the tropical and subtropical regions of the world (Fairchild, 1943; Martin and Malo, 1978; Morton, 1986; 1987). However, without definitive data on the quality, yield potential and horticultural characteristics of clonal selections, management decisions are difficult. Future research is needed into storage, shipping, marketing, and potential uses

of the canistel in processing. Only then can the canistel become more than just another tropical fruit with potential.

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## 'DOT': A GOURMET MANGO CULTIVAR FOR THE HOME GARDEN

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**Abstract.** Florida has been the selection site for quality mango cultivars over the last several decades, including many which never received wide distribution due to a lack of commercial attributes. 'Dot' is one such cultivar selected by Lawrence Zill from a 'Carrie' seedling planted in Boynton Beach, FL. The pollen parent is unknown. 'Dot' forms a medium-sized, open canopy, typically with a slightly yellow or light green leaf color in comparison with other mango cultivars. The fruit range from 260 to 550 g, with an average size of 400g. Fruit size is variable within an individual tree; however, the small fruit develop normally. The fruit are attractive, with a bright yellow ground color and a pink to light red blush. The flavor is rich and aromatic with a high sugar content (18-22°Brix) and fiberless flesh. In public taste evaluations, 'Dot' consistently scores among the top for overall flavor. In South Florida the fruit ripen over an extended season (5 weeks or more) in mid-summer. Anthracnose (*Colletotrichum gloeosporioides*) infection can limit production in some years, but generally an acceptable crop is obtained without fungicide applications. Exact yield data are not available, but production in cultivar collections with a chemical disease control program is comparable to, or better than 'Glenn', while inferior to the commercial cultivars 'Tommy Atkins' and 'Keitt'.

During this decade there have been major changes within the global mango industry; namely, a steady increase in the production and exportation of highly-colored (red) cultivars destined for sale within the countries of the European Com-

munity, the Orient and the United States (Báez-Sañudo y Bringas-Taddei, 1995; Campbell and Bernard, 1994). As a result of this steadily increasing supply, the mango has become a consistent and affordable commodity for consumers within mainstream marketing channels of these countries and there has been a general increase in the exposure to, and interest in this fruit. The mango cultivars which comprise the export industries of the world were largely selected in South Florida over the past 50 years (Campbell and Campbell, 1993; Young and Sauls, 1978); yet, many selections were discarded during this period of selection because they were judged unsuitable for commercial production. Often, these cultivars were superior in terms of flavor and overall quality, but could not be commercially exploited due to their color, disease resistance, production or storage characteristics.

At present, the combined effect of an ethnically-diverse populace, increased availability and exposure to the mango, and promotional efforts like Fairchild Tropical Garden's International Mango Festival (held in July each year in Miami) have served to develop a greater consciousness of mango cultivar diversity. In South Florida, where the mango has historically been a popular home garden fruit tree, the result has been increased planting of high-quality mango cultivars in the home landscape. This activity offers an important market for local tree nurseries. The heightened consciousness and consumption of high-quality mango cultivars may also raise the acceptance of these cultivars in mainstream marketing channels within the United States and beyond. The objective of this paper is to describe one such mango cultivar, 'Dot', whose outstanding internal quality characteristics uniquely suit it for use in the home garden.

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